

## Maintaining Formation Flight Around L2

Martin Lo<sup>1</sup>, Gerard Gómez<sup>2</sup>, Kathleen Howell<sup>3</sup>, Josep Masdemont<sup>4</sup>, Jeffrey Parker<sup>5</sup>,  
and Scott Mitchell<sup>6</sup>

(Email: [Martin.Lo@jpl.nasa.gov](mailto:Martin.Lo@jpl.nasa.gov))

<sup>1</sup>Jet Propulsion Laboratory, Pasadena, California

<sup>2</sup>University of Barcelona, Barcelona, Spain

<sup>3</sup>Department of Aeronautics and Astronautics, University of Purdue, West Lafayette, Indiana

<sup>4</sup>Universitat Politècnica de Catalunya, Barcelona, Spain

<sup>5</sup>University of Colorado, Boulder, Colorado

<sup>6</sup>Ball Aerospace and Technologies Corporation, Boulder, Colorado

A key issue for TPF formation flight around L2 is the cost for station-keeping the formation in a halo orbit. Not only do we need to make sure the formation remains around L2, but we also need to make sure that it maintains its general shape. The shape control is mainly to ensure that the communications geometry (Sun-spacecraft-Earth angle) does not become so small that the noise from the Sun interferes with the communications from Earth to the spacecraft. However, since TPF requires a multitude of daily maneuvers for the formation control, station-keeping maneuvers may be inserted easily. For libration missions, the more frequently station-keeping maneuvers are performed, the lower the cost. In fact, if maneuvers are performed at too high a frequency, the thrust level per maneuver required may be too small to be performed by current thrusters. In this paper, we present some preliminary results on the requirements for station-keeping the TPF formation around L2.